STATE OF CALIFORNIA – THE RESOURCES AGENCY ARNOLD SCHWARZENEGGER, *Governor*

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
P.O. BOX 942896
SACRAMENTO, CA 94296-0001
(916) 653-6624 Fax: (916) 653-9824
calshpo@ohp.parks.ca.gov
www.ohp.parks.ca.gov

August 23, 2004

Dr. Stephanie Toothman
National Park Service
Pacific West Region
909 First Street
Seattle, Washington 98104-4159

Dear Dr. Toothman:

Thank you for the opportunity to comment on the National Register Multiple Property nomination for Yosemite National Park. I concur that the properties identified and evaluated n the nomination do constitute a coherent group of geographically dispersed resources that are eligible for listing in the National Register. The nomination does an excellent job of defining separate, but related contexts that make clear the significance of the individual resources, as well as the reasons that they collectively constitute a multiple property. The inclusion of a number of the park's less elaborate, high altitude resources is particularly noteworthy. The context statements synthesize a large amount of historic documentation in a clear and concise manner and the descriptive material that is provided for the individual resources or resource groupings is excellent.

We concur in all of your findings regarding the resources enumerated in the multiple property nomination. We agree that the following properties are eligible for the National Register as a part of a multiple property.

Lake Vernon Cabin Building #2450
May Lake High Sierra Camp Historic District
Hetch Hetchy Comfort Station Building #2104
Henness Ridge Fire Lookout Building #5300
The Golden Crown Mine
Glen Aulin Sierra Camp Historic District
Chinquapin Historic District
Buck Creek Cabin Building #4800
Snow Flat Cabin #Building #3501
Snow Creek Cabin Building #3450
Sachse Springs Cabin Building #2452
Ostrander Ski Hut Building #5110
Old Big Oak Flat Road
New Big Oak Flat Road
Merced Lake Ranger Station Building #3400
Merced Lake High Sierra Camp Historic District

Wawona Tunnel
Vogelsang High Sierra Camp Historic District
Tuolumne Meadows High Sierra Camp Historic District

I have signed the application as commenting authority. If you have any questions, please call Gene Itogowa of my staff (916) 653-8936.

Sincerely,

Milford Wayne Donaldson
State Historic Preservation Officer

Cc: Kimball Koch

NPS Form 10-900
(Rev. Aug. 2002)

OMB No. 1024-0018
(Expires Jan. 2005)

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES REGISTRATION FORM

This form is for use in nominating or requesting determinations for individual properties and districts. See instructions in How to Complete the National Register of Historic Places Registration Form (National Register Bulletin 16A). Complete each item by marking "x" in the appropriate box or by entering the information requested. If any item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, architectural classification, materials, and areas of significance, enter only categories and subcategories from the instructions. Place additional entries and narrative items on continuation sheets (NPS Form 10-900a). Use a typewriter, word processor, or computer, to complete all items.

1. Name of Property

historic name Wawona Tunnel

other names/site number _____

2. Location

street & number N/A not for publication ___

city or town Yosemite National Park (YOSE) vicinity ___

state California code CA county Mariposa code 043 zip code 95389

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act of 1986, as amended, I hereby certify that this___ nomination___ request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property ____ meets ____ does not meet the National Register Criteria. I recommend that this property be considered significant ___ nationally ___ statewide ___ locally. (___ See continuation sheet for additional comments.)

_____ _____
Signature of certifying official Date

_____
State or Federal agency and bureau

In my opinion, the property ____ meets ____ does not meet the National Register criteria. (___ See continuation sheet for additional comments.)

_____ _____
Signature of commenting or other official Date

_____
State or Federal agency and bureau

4. National Park Service Certification

I, hereby certify that this property is:

____ entered in the National Register
___ See continuation sheet.
____ determined eligible for the National Register
___ See continuation sheet.
____ determined not eligible for the National Register

Signature of Keeper Date of Action

Wawona Tunnel
Name of Property

Mariposa, CA
County and State

____ removed from the National Register

____ other (explain): _____

5. Classification

Ownership of Property
(Check as many as apply)

___ private
___ public-local
___ public-State
_X_ public-Federal

Category of Property
(Check only one)

__ building(s)
___ district
___ site
_X_ structure
___ object

Number of Resources within Property
(Do not include previously listed resources in the count)

Contributing	Noncontributing	
		buildings
		sites
2		structures
		objects
2	0	Total

Name of related multiple property listing
(Enter "N/A" if property is not part of a multiple property listing.)
Historic Resources of Yosemite National Park, California

Number of contributing resources previously listed in the National Register
0

6. Function or Use

Historic Functions
(Enter categories from instructions)

TRANSPORTATION/road related (vehicular)

Current Functions
(Enter categories from instructions)

TRANSPORTATION/road related (vehicular)

7. Description

Architectural Classification
(Enter categories from instructions)
Other: NPS Rustic

Materials
(Enter categories from instructions)
foundation rock; granite; concrete; asphalt
walls rock; granite; steel-reinforced concrete
roof rock and drill lined concrete
other

Narrative Description
(Describe the historic and current condition of the property on one or more continuation sheets.)

8. Statement of Significance

Applicable National Register Criteria
(Mark "x" in one or more boxes for the criteria qualifying the property for National Register listing)

_X__ **A** Property is associated with events that have made a significant contribution to the broad patterns of our history.

_____ **B** Property is associated with the lives of persons significant in our past.

_X__ **C** Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.

_X__ **D** Property has yielded, or is likely to yield, information important in prehistory or history.

Areas of Significance
(Enter categories from instructions)

Transportation
Architecture
Landscape Architecture

Period of Significance
1931-1938

Criteria Considerations
(Mark "X" in all the boxes that apply.)

____ A owned by a religious institution or used for religious purposes.
____ B removed from its original location.
____ C a birthplace or a grave.
____ D a cemetery.
____ E a reconstructed building, object, or structure.
____ F a commemorative property.
____ G less than 50 years of age or achieved significance within the past 50 years.

Significant Dates
N/A

Significant Person
(Complete if Criterion B is marked above)
N/A

Cultural Affiliation
N/A

Architect/Builder
National Park Service

Narrative Statement of Significance
(Explain the significance of the property on one or more continuation sheets.)

9. Major Bibliographical References

Bibliography
(Cite the books, articles, and other sources used in preparing this form on one or more continuation sheets.)

Previous documentation on file (NPS)

___ preliminary determination of individual listing (36 CFR 67) has been requested.
___ previously listed in the National Register
___ previously determined eligible by the National Register

Primary location of additional data

____State Historic Preservation Office
____Other State agency
____Federal agency
____Local government
____University

Wawona Tunnel
Name of Property

Mariposa, CA
County and State

___ designated a National Historic Landmark
___ recorded by Historic American Buildings Survey
_____
_X_ recorded by Historic American Engineering
Record # _CA-105_

_X_ Other
Name of repository:
Yosemite National Park, California

10. Geographical Data

Acreage of Property _80_

UTM References
(Place additional UTM references on a continuation sheet)

	Zone	Easting	Northing		Zone	Easting	Northing
1	11	262650	4177650	**3**	11	264225	4177275
2	11	264225	4177525	**4**	11	262650	4177400

___ See continuation sheet.

Verbal Boundary Description
(Describe the boundaries of the property on a continuation sheet.)
The National Registry boundary includes the Wawona Tunnel Road tunnel, the east and west portal areas, and the stone retaining wall around the parking area on the east end at Discovery View

Boundary Justification
(Explain why the boundaries were selected on a continuation sheet.)
The boundary encompasses the historically and architecturally significant Wowona Road tunnel, its east and west entrances, and the rustic low stone walls around the parking lot at the east end of the tunnel that are part of the general landscaping of the area.

11. Form Prepared By

name/title Andy Kirk, Richard Coop, Charles Palmer

organization UNLV Public History date 3/8/04

street & number 4505 Maryland Parkway Box 455020 telephone (702)895-3544

city or town Las Vegas state NV zip code 89135-5020

Additional Documentation

Submit the following items with the completed form:

Continuation Sheets
Maps
A **USGS map** (7.5 or 15 minute series) indicating the property's location.
A **sketch map** for historic districts and properties having large acreage or numerous resources.
Photographs
Representative **black and white photographs** of the property.
Additional items
(Check with the SHPO or FPO for any additional items)

Property Owner

(Complete this item at the request of the SHPO or FPO.)
name _____
street & number_____ telephone_____
city or town_____ state_____ zip code _____

Paperwork Reduction Act Statement: This information is being collected for applications to the National Register of Historic Places to nominate properties for listing or determine eligibility for listing, to list properties, and to amend existing listings. Response to this request is required to obtain a benefit in accordance with the National Historic Preservation Act, as amended (16 U.S.C. 470 et seq.).

Estimated Burden Statement: Public reporting burden for this form is estimated to average 18.1 hours per response including the time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding this burden estimate or any aspect of this form to the Chief, Administrative Services Division, National Park Service, P.0. Box 37127, Washington, DC 20013-7127; and the Office of Management and Budget, Paperwork Reductions Project (1024-0018), Washington, DC 20503.

Summary

The Wawona tunnel, constructed along the Wawona road as it descends into Yosemite Valley, is nearly a mile long and was bored through solid granite. It is 4,230 feet long, 19 feet high, and 28 feet wide. The unusual ventilation problems posed by the tunnel's grade and peculiar atmospheric conditions and the intense traffic flow required installation of automatic safety devices to keep the tunnel free of dangerous levels of carbon monoxide gas. This section of the new Wawona road was designed to go through the granite cliffs, thus avoiding unsightly scars. The west portal is a poured-in-place concrete extension of the barrel-vault interior of the tunnel. Some efflorescence is present on interior surfaces. The large adit with ventilation fans is located near the center of the tunnel. The east portion of the tunnel is cut from natural rock, as is the east portal.

General Description

The construction of the new $2,000,000 Wawona road between Yosemite Valley and the Mariposa Grove of Big Trees involved the construction of a highway tunnel 4,230 feet in length. This bore penetrated the solid granite cliffs on the south side of Yosemite Valley above Bridalveil Fall.

A.C. Goerig of Seattle, Washington, was contractor on the tunnel construction, working under the direct supervision of the U.S. Bureau of Public Roads. Driving of the tunnel started January 30, 1931, and was completed on January 6, 1932. About 700 feet of the tunnel are concrete lined. Three tunnels were driven from the main bore to the cliff face. Electrically driven fans, operating automatically according to the percentage of deadly carbon monoxide gas in the air, ventilate the tunnel. Analyzers and recorders were installed to determine and automatically record the amount of carbon monoxide saturation. The recording devices were connected with the motors driving the ventilating fans by a system of electric relays, so that they automatically controlled the fan operations. The recorders were also connected with a semaphore signal and warning bell at each portal so that whenever the saturation of carbon monoxide reached the danger point, the semaphore arm would drop to a "stop" position, a red light showed, and a warning bell rang. It was believed that this was the first instance that automatic features for ventilating control and traffic signals had been tied to the operation of carbon monoxide recorders and analyzers. The automatic control features were developed and designed by Mr. Walter Champion of the Bureau of Public Roads. The equipment was located in a control room adjacent to the entrance of the main ventilating adit.

Two hundred thirty tons of dynamite were used in blasting out the rock in this tunnel. The daily blasts averaged nearly a ton and a half of dynamite, fired by electric blasting caps. A full-size railroad steam shovel operated by compressed air, removed the blasted material, which was hauled out of the tunnel in trains pulled by small electric locomotives. All of the excavated material was used to construct the approach road from the valley floor and the parking area. Timbering was unnecessary because the granite was solid. As an added safety feature, however, 775 feet of reinforced steel concrete was placed where there was any question of loose rock. Not a single person was

killed or seriously injured on this construction project. The $847,000 tunnel opened for travel on June 18, 1933.

Statistics
Maximum depth of rock above tunnel is 550 feet.

Maximum distance from tunnel to edge of cliff is 503 feet.

Length of tunnel is 4,230 feet; width, 28 feet; height, 19 feet.

Grade in tunnel, 5 percent; grade on approaches, 6 percent.

Average daily progress driving the bore, 20 feet.

Total of 275 tons of powder used; about 2,000 lbs. per shot average.

Eighty-five tons of drill steel were worn out on the tunnel construction; 5,000 feet of drill steel were used in each shift.

U.S. Bureau of Public Roads Officials and Engineers in charge of tunnel construction:
- Dr. L.I. Hewes - Deputy Chief Engineer
- C.H. Sweetser - District Engineer
- Levant Brown - Senior Highway Engineer
- H.S. Tolen - Supervising Engineer
- T.M. Roach - Resident Engineer

U.S. Bureau of Mines:
- C. Ash - District Engineer

National Park Service Architectural Division:
- T.C. Vint - Chief Architect
- J.B. Wosky - Resident Architect

National Park Service Board of Expert Advisers:
- John P. Buwalda
- Duncan McDuffie
- Frederick Law Olmsted

Significance
Property Type: Resources Associated with Settlement and Industry (1851-1951)
Subtype: Transportation
Property Type: Resources Associated with State and Federal Administration of Yosemite (1864-1966)
Subtype: National Park Service Administration
Property Type: National Park Service Landscape Architecture in Yosemite (1916-1940)
Period of Significance: 1931-1938

The Wawona tunnel is considered significant in the fields of transportation, architecture, and landscape architecture. It was built as part of the rerouting of the old Wawona road between Yosemite Valley and Grouse Creek, where engineers determined that a tunnel was necessary to attain a satisfactory grade. Construction of a tunnel would also be cheaper and require less excavation. Its construction was an innovation in highway design within the National Park System, following the precedent set by the Zion Park highway tunnel. Upon completion, it was the longest vehicle tunnel in the western United States. CCC enrollees landscaped fills and cut banks by planting native vegetation to restore natural conditions. In addition to its bold conception, the tunnel was the only engineering solution that guaranteed preservation of the granite cliffs and full protection of landscape values.

Historical Context
The Wawona road, beginning at Bridalveil Fall, rises along the southern side of Yosemite Valley, passes through the Wawona tunnel, and climbs to the valley rim at Turtleback Dome. After gradually ascending to Chinquapin, it drops through beautifully wooded areas to Wawona and its southern terminus near the Mariposa Grove of Big Trees. It not only serves as the southern entrance to Yosemite National Park, but provides a comfortable and safe means of reaching some of the parks most beautiful and stimulating vistas. The Wawona tunnel is located 1.7 miles from the northern terminus of the Wawona road and it receives all of the automobile traffic passing over that route. The natural scenic beauty of the valley unfolds as one exits from the east portal of the tunnel, making it a spot visited by thousands of tourists during the year.

In 1926 a representative of the Bureau of Public Roads was detailed to make a road system study throughout Yosemite National Park. During the course of this survey, it was found that a satisfactory road between Yosemite Valley and Grouse Creek could not pass over the mountain at Inspiration Point. Considerable study was given to this problem. It developed that a satisfactory grade could only be obtained by running the road along the bluffs, and those bluffs were so steep that it would be necessary to drive a tunnel. A tunnel 1,600 feet long was first considered, but the open cut on the lower end would be so large that it would be impossible to dispose of excavated material. Further study showed that by driving a tunnel 4,230 feet long, the road could be constructed more cheaply and less excavation would be needed. This project was favored by the Director of the National Park Service, the park superintendent, the landscape

division, the Board of Expert Advisers of Yosemite National Park, and numerous others.

The tunnel would be 4,230 feet long, 28 feet wide, and 19 feet high above the pavement. All the excavated material obtained from boring from the east end would be used in constructing the approach road from the valley and a parking area, thus making it unnecessary to have spoil banks that would devastate the vegetation.

The decision to bore the tunnel was made only after exhaustive studies had been made of every other alternative. A road benched out of the palisades would have made an irremediable scar, ruinous to the landscape. An underpass near the foot of Bridalveil Fall was studied, but finally rejected. A zigzag road would have been unsafe for modern traffic and would have comprised an appalling defacement.

Some of America's most competent landscaping and engineering authorities collaborated with the National Park Service in these various studies. The tunnel proved to be the solution. In building the road, the NPS landscape division insisted that considerable attention be devoted to protection of trees and brush from blasted rocks both above and below the roadbed. Plans included a large parking area at the lower end of the tunnel. At that point a much better view of the valley, falls, and cliffs could be obtained than from old Inspiration Point, which was bypassed when the tunnel passed through the mountain shoulder over which the old Wawona road climbed. These considerations permitted the construction of a modern mountain highway, and the preservation of all of its priceless scenic and landscape values. The lower portal is located at a point which the visitor emerges into the Yosemite Valley - a view that is fairly explosive in its grandeur and which a majority of artists and laymen believe surpasses old Inspiration Point.

The tunnel was placed under construction in November 1930 and opened to traffic in the spring of 1933. The tunnel was bored through solid granite and was unlined except in those sections where the poor condition of the rock necessitated a supporting lining. Upon completion of the tunnel, it was recognized that disintegration of the surface rock due to air slacking, was bound to occur and that a small annual maintenance expense would have to be incurred to insure the safe passage of traffic. During the summer of 1934, nearly $4,000 was spent removing loose rock. This not only exceeded the anticipated maintenance expense, but the condition was becoming an increasing hazard to motor traffic.

As a result of a conference held in July 1934 between Yosemite National Park officials and Bureau of Public Roads engineers, it was decided to place a thin gunite lining on the unlined portions of the tunnel. This would effectively stop air slacking of the rock and would reduce the excessive seepage of groundwater in certain sections of the tunnel.

After the tunnel and fresh air adits were completed, it was apparent that the natural draft could not be relied upon for

complete ventilation of the tunnel. To add complete safety to the tunnel's other advantages, the National Park Service brought in the Bureau of Mines with its automatic machinery to free the tunnel of deadly carbon monoxide gas. This equipment is entirely automatic in operation, and is so sensitive that when one part of carbon monoxide is present in 20,000 parts of atmosphere, the first battery of nine-foot airplane type reversible fans starts at low speed. Additional similar percentages of gas automatically speed up the operation of the three fans until, when the concentration of monoxide has reached six parts in 20,000 -- a danger point -- all fans are in operation at high speed, exhausting impure air at the rate of 300,000 cubic feet per minute. Simultaneously, semaphores drop automatically and gongs sound a warning tocsin. These carbon monoxide analyzers operate continuously, 24 hours a day, drawing samples of air, one from the upper section and one from the lower section of the tunnel, making a permanent record. Telephones are installed for public use in emergencies in the tunnel, and three adits permit passage afoot to the outside face of the cliff if need arises.

With completion of the tunnel and of the new Wawona road, Wawona and the Mariposa Grove of Big Trees were brought to within forty-five and sixty minutes of Yosemite Valley. The large fills and cut banks of the Wawona road were landscaped by the Civilian Conservation Corps (CCC), which planted native vegetation to restore natural conditions. The road was hard-surfaced and dust-proofed by contractors. Completion of the tunnel signaled a new era in the southern approach to Yosemite. The improvement was accomplished within Yosemite by means of this tunnel while spectacular because of the boldness of its conception, was also the sole engineering solution that guaranteed the preservation of the priceless palisades and
the full protection of those incalculable landscape values for which the National Park Service is responsible.

The construction of the new Wawona road and tunnel took place during the administration of Park Superintendent Colonel C.G. Thomson, who had come from Crater Lake National Park in 1929 to succeed W.B. Lewis. An admirer later stated:

> Colonel Thomson has, through his dynamic personality and energy and the wealth of his experience, been an influence and inspiration not only to the thousands of Park visitors with whom he has had personal contact, but especially to the Park Service itself. His keen sense of the fitness and desire for the harmony of things in the national parks has made itself felt in the design of every road, every structure, and every physical development in the Park. He recognized the importance and practicability of restricting and harmonizing roads and structures into a natural blending of the surroundings. He has set a standard of beauty and symmetry in construction which has been carried beyond the limits of Yosemite into the entire National Park system.

The construction of the Wawona tunnel was a significant event in the history of landscape architecture as applied to

road planning within the National Park System. It attests to the Service's desire in the 1930s to blend man-made intrusions into the natural environment as much as possible. In accord with that desire, the rock cuts and ledges resulting from construction of the new Wawona road were painted to give an aged appearance. This was also done on the Wawona tunnel west portal, which was spray painted with a mixture of linseed oil, mineral spirits, and lamp black.

Significant structures in this nomination include the Wawona tunnel and the low stone retaining walls around the parking area. The walls succeed in softening the harsh aspects of the parking area when viewed from across Yosemite Valley. Changes for safety reasons to the tunnel, the road, or the parking area will not affect the significant values for which these resources are being nominated.

Bibliography

Finley, Michael V., Superintendent, Yosemite National Park to Regional Director, Western Region "Review of National Register forms for factual data," September 7, 1989.

Historic American Engineering Record, "Wawona Tunnel, Yosemite National Park" HAER No. CA-105 (Washington: Department of the Interior, 1992)

McClelland, Linda Flint. *Building the National Parks: Historic Landscape Design and Construction*. Baltimore: Johns Hopkins University Press, 1998.

Payne, E. B., Final Construction Report, Wawona Tunnel Lining, Yosemite Park Project 2-A5, Tunnel Lining, Yosemite National Park, Mariposa County, California, March 28, 1936, Yosemite Research Library.